

4
A (i) a vinyl acetate emulsion comprising a homogenous blend of suspended polyvinyl acetate particles in polyvinyl alcohol and water, and a solution comprising a 10% to 25% solution of polyvinyl alcohol to water, said solution being present in said composition in an amount of approximately 0.1% to about [25%] 30% of said vinyl acetate emulsion;

(ii) a water-based non-V.O.C. acrylic emulsion comprising acrylic particles suspended in solution; and

(iii) a water-based non-V.O.C. polyurethane emulsion comprising polyurethane particles suspended in solution.

6.(ONCE AMENDED) A composition suitable for use in the manufacture of construction board comprising:

7
A a dry powder mineral substrate selected from the group of minerals comprising calcium sulfate, perlite, and combinations thereof; and

A a synthetic binder, said synthetic binder comprising starch, a boron source, and an emulsion selected from the group consisting essentially of:

(i) a vinyl acetate emulsion comprising a homogenous blend of suspended polyvinyl acetate particles in polyvinyl alcohol and water, and a solution comprising a 10% to 25% solution of polyvinyl alcohol to water, said solution being present in said composition in an amount of approximately 0.1% to about [25%] 30% of said vinyl acetate emulsion;

(ii) a water-based non-V.O.C. acrylic emulsion comprising acrylic particles suspended in solution; and

(iii) a water-based non-V.O.C. polyurethane emulsion comprising polyurethane particles suspended in solution.

22.(ONCE AMENDED) A method of manufacturing a construction grade board product comprising the steps of:

(a) forming a first mixture by adding a first emulsion to a stream of metered water, said first emulsion being selected from the group consisting essentially of:

8
A
(i) a first solution comprising a 10% to 25% solution of polyvinyl alcohol to water added to a vinyl acetate emulsion comprising a homogeneous blend of suspended polyvinyl acetate particles in polyvinyl alcohol and water, such that said first solution is present in said first emulsion in an amount of approximately 0.1% to about [25%] 30% of said vinyl acetate emulsion;

(ii) a water-based non-V.O.C. acrylic emulsion comprising acrylic particles suspended in solution; and

(iii) a water-based non-V.O.C. polyurethane emulsion comprising polyurethane particles suspended in solution;

(b) forming a second mixture by adding a mineral selected from the group consisting essentially of calcium sulfate, perlite, and combinations thereof, to said first mixture;

(c) combining said second mixture with an additional amount of water;

(d) gradually preparing a slurry by mixing and stirring said second mixture and said water to form said slurry;

(e) enveloping said slurry between two paper cover sheets to form a wet board; and

(f) drying said wet board at a temperature in the range of 75°C to 325°C.